

Environmental Studies Program: Ongoing Study

Study Area(s): Western GOM, Central GOM, Eastern GOM

Administered By: GOM OCS Region

Title: Florida Manatee Movement and Habitat Use in the Northern Gulf of Mexico (GM-13-07)

BOEM Information Need(s) to be Addressed: The exploration and development of oil and gas resources in the Gulf of Mexico (GOM), as well as potential renewable energy and alternate use projects, will require BOEM to produce information for a variety of NEPA-related decision documents, as well as maintaining compliance with Endangered Species Act (ESA) and Marine Mammal Protection Act (MMPA). The West Indian manatee is included as an endangered species under the purview of the ESA, as well as receives protections afforded by the MMPA. All data acquisition outlined here is covered under federal research permits that comply with federal protection mandates.

Total BOEM Cost: \$1,000,000

Period of Performance: FY 2013–2018

Conducting Organization(s): U.S. Geological Survey, Southeast Ecological Science Center

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Description:

Background: In 1953, the Outer Continental Shelf Lands Act (OCSLA) [67 Stat. 462] established Federal jurisdiction over the submerged lands of the continental shelf seaward of State boundaries. The Act charged the Secretary of the Interior with the responsibility for administering minerals exploration and development of the outer continental shelf (OCS). It also empowered the Secretary to formulate regulations so that the provisions of the Act might be met. The OCSLA Amendments of 1978 (92 Stat. 629) established a policy for the management of oil and natural gas in the OCS and for protection of the marine and coastal environments. The amendments authorize the Secretary of the Interior to conduct studies in areas or regions of sales to ascertain the “environmental impacts on the marine and coastal environments of the OCS and the coastal areas which may be affected by oil and gas development” (43 U.S.C. 1346).

Subsequent to the passage of the OCSLA of 1953, the Secretary of the Interior designated the Bureau of Land Management (BLM) as the administrative agency responsible for leasing submerged federal lands and the U.S. Geological Survey for supervising production. In 1982, the (former) Minerals Management Service (now BOEM) assumed these responsibilities. To meet its responsibilities, BOEM has four priority goals for OCS leasing: (1) orderly resource development to meet the Nation's energy needs; (2) protection of the marine and coastal environments; (3) receipt of fair market value; and (4) preservation of free enterprise competition.

The National Environmental Policy Act (NEPA) of 1969 (42 USC 4321-4347) requires that all federal agencies use a systematic, interdisciplinary approach that will ensure the integrated use of the natural and social sciences in any planning and decision-making that may have an effect on the human environment. BOEM efforts in this direction include environmental impact statements, environmental assessment teams, studies that acquire and analyze marine environmental data, literature surveys, socioeconomic analysis studies, public conferences, and special studies (toxicity studies, spill trajectory analyses, *etc.*).

The U.S. Geological Survey (USGS) Southeast Ecological Science Center (SESC) is a research center that provides accurate science on the biology and ecology of aquatic environments throughout the United States and around the world.

Objectives: This research initiative is projected as a 3-year study on northern GOM manatee distribution and use patterns, and characterization of local resources. Specific goals include:

- Compile available coastal data and conduct field sampling to characterize areas used by manatees during the warm season. Identify specific resources used by manatees at these sites including locations of available freshwater and extent of aquatic vegetation used as forage.
- Identify and assess natural and artificial warm water sites available for over-wintering manatees. Particular attention will focus on the importance of passive, artificial and natural springs accessible to manatees in the northern GOM from Crystal River to Texas.
- Determine the extent of movements and seasonal site fidelity among identifiable manatees that use focal use areas in the northern GOM.
- Assess the population structure of manatees by employing established sampling protocols used by USGS for manatee genetic and photo-identification studies.
- If biological samples are available (biopsy, blood, urine, feces, genetics), provide information on manatee health parameters and nutritional body condition.
- Determine the status of manatee abundance and distribution in critical segments of the northern GOM study area. Map available and potential manatee habitat in the northern GOM through the use of manatee habitat modeling incorporating data from habitat surveys and movement patterns derived from radio tracking manatees within the region. Employ statistically sound methods suitable for identifying and forecasting changes/trends in manatee abundance and distribution.

Methods: The area of interest for this study extends from the Suwannee River, Florida, west along the Gulf coast through Texas. Manatee distribution and habitat will be

assessed through a comprehensive set of complementary research activities that together will provide information on spatial and temporal manatee use of the northern Gulf of Mexico, the health and disposition of individual manatees traversing the study area, and the extent and quality of the habitat that they may use. Several potential research actions involving multiple agencies and partners will be considered.

Habitat characterization will begin with a survey of available data, especially from recent work that supported research following the 2010 Deepwater Horizon incident. Areas of interest within the study area that do not have adequate data coverage will be targeted for aerial imagery interpretation, and fieldwork using techniques developed for seagrass characterization and mapping by Slone *et al.* (2013a, b). Temperature and salinity probes (Onset, Inc.) will be used to provide continuous logging of environmental parameters at selected sites to determine seasonal water temperature and salinity regimes across the study area.

Photographic identification records of scarred manatees have been collected and compiled in the Manatee Individual Photo-identification System (MIPS), a database containing photographs and life history information for Florida manatees across their range. In addition to photographs and sketches of markings, MIPS includes information about the location of each sighting and notes on age, size, injuries, health, and behavior. Today, there are over 50,000 sighting records for the nearly 2,800 individuals in the catalog (USGS Files), which provide sighting histories that are used to document fidelity of individuals to specific aggregation sites, long-distance travels, and to estimate survival and reproductive rates (Beck and Clark, 2012). Photographs of manatees in the northern GOM will be compiled and matched to the MIPS database to document individual animal movements and fidelity, as well as prior sighting histories.

Individual manatees will be captured for health assessments and radio tagging (Bonde *et al.* In press). Manatee captures typically involve nylon nets deployed by either land-based or open-water techniques on targeted manatees. Individual manatee health will be monitored, including temperature, respiration and pulse rate, and handling time will be kept to a minimum (less than one hour if possible). Assessed individuals will be released at or close to their original capture location. Additional data recorded upon capture will include morphometrics (total length and girths), sex and complete photographs consisting of scars or natural markings. During capture complete out-of-water monitoring and biological sampling will be performed by trained personnel under veterinary supervision following guidelines established by Stamper and Bonde (2012).

Manatee radio tagging and tracking techniques have been well developed for documenting movement and habitat use areas (Marmontel *et al.* 2012). Manatee tags consist of a padded belt/harness around the caudal peduncle with a tethered floating radio tag that enables manatees to be tracked in saltwater habitats (Deutsch *et al.* 1998; 2003). Manatees in the northern GOM will be tagged with Argos-linked GPS tags, which relay GPS locations through a satellite link for remote location determination and relay of sensor data. This combination allows both remote monitoring and fine-scale analysis of movement patterns, with user defined sampling rates over three to nine months. In addition to location determination, remote monitoring and near real time data availability, these tags record transmitter temperature, activity and dive periods, and

other sensor data. Specific findings will include identification of habitat hotspots, site fidelity, characterization of large-scale moves or movement highways and characterization of foraging movements.

GIS integration of habitat data and matching location data have proven effective for analyzing manatee habitat use patterns (Castelblanco-Martinez *et al.* 2012; Slone *et al.* 2013a, b). With the addition of on-board readings from Time-Depth Recorders, or salinity and temperature sensors, the activity of manatees can be categorized into behavior types such as foraging, travelling, resting, drinking, or other types (Slone *et al.* 2013b). Once a part of the underlying habitat has been described, the manatees' use of similar habitat can be used to predict locations of other similar habitat, which can then be verified through field sampling. This form of GIS interpretation, integrated with field sampling, will be used throughout the period of performance to create maps of functional habitat types, along with detailed assessments of the underlying habitat components (salinity, temperature, seagrass, wave activity, *etc.*) that contributes to manatee use (or lack of) the study area.

Activities will be conducted in accordance with permit requirements identified in the FWS research permit (MA791721-5) issued to the USGS/Sirenia Project and comply with USGS/SESC IACUC standards.

Current Status: This effort was awarded July 2013 and is currently collecting data.

Final Report Due: December 2018

Publications Completed: None

Affiliated WWW Sites: <http://fl.biology.usgs.gov/Manatees/manatees.html>,
<https://marinecadastre.gov/espis/#/search/study/100047>

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